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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,516	08/31/2001	David W. Hartwell	15311-2307	3328

24267 7590 06/28/2004

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EXAMINER

KING, JUSTIN

ART UNIT PAPER NUMBER

2111

DATE MAILED: 06/28/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/944,516

Applicant(s)

HARTWELL ET AL.

Examiner

Justin I. King

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2003.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-20 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2 and 3.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: The last limitation states “if the interrupt queue register is full, one of waiting a preset time and reposting the new interrupt to the interrupt queue register, and draining the contents of the interrupt queue register into the memory subsystem so that the interrupt queue register can store the new interrupt”. The limitation does not seem to be a completed sentence. Appropriate correction is required.
2. Claims 1 and 5 state the limitation of “new interrupt”. The so-called “new” interrupt is reposted, not new.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-5, 12, 14-15, 16-18, and 20 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure, which is not enabling. The Control Status Register (CSR) for tracking the priority level, the interrupt starvation counter, and the threshold are critical or essential to the practice of the invention, but not included in the claims (as illustrated in figure 5). See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). Claims 1 and 16 state the option of draining the interrupt queue register and claims 2-5, 12, 14-15, 17-18, and 20 incorporate this limitation, but none of them provides any condition and means for adapting this option.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the new interrupt" on lines 11-12. There is insufficient antecedent basis for this limitation in the claim. Claims 2-15 are rejected because they incorporate claim 1's limitations.

Claim 11 recites the limitation "the in-memory FIFO queue" on line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 13 is rejected because they incorporate claim 1's limitations.

Allowable Subject Matter

7. Claims 6-11, 13, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

8. The following is a statement of reasons for the indication of allowable subject matter: The prior arts on record do not disclose or explicitly teach an anti-starving interrupt protocol which includes a first and a second control status registers (CSRs). The first CSR buffers information, such as interrupts, received by the processor, while the second CSR keeps track of

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the priority level of the interrupts. When an interrupt controller receives an interrupt, it issues a write transaction to the first CSR at the processor. If the first CSR has room to accept the write transaction, the processor returns an acknowledgement, whereas if the first CSR is already full, the processor returns a no acknowledgment. In response to a no acknowledgment, the interrupt controller increments an interrupt starvation counter, and checks to see whether the counter exceeds a threshold. If not, the interrupt controller waits a preset time and reposts the write transaction. If it does, the interrupt controller issues a write transaction having a higher priority to the second CSR. In response, the processor copies all of the pending interrupts from the first CSR into the memory subsystem, thereby freeing up the first CSR to accept additional write transactions.

The "Operating System Concepts", as a popular academic textbook, teaches the preemptive priority (pages 120-122), but it neither explicitly teaches claimed conditions before preempting the existing tasks nor it teaches the application on the interrupt management. Chung et al. (U.S. Patent No. 5,931,936) and Brady et al (U.S. Patent No. 5,606,703) teach a priority-decision mechanism for managing interrupt, but Chung does not explicitly disclose or teach the two claimed status control register and subsystem memory to preempt the existing interrupts. Priem (U.S. Patent No. 5,754,866) discloses the delayed interrupt which is delayed by a predetermined period of time, but Priem does not disclose or teach two claimed status control register and subsystem memory to preempt the existing interrupts.

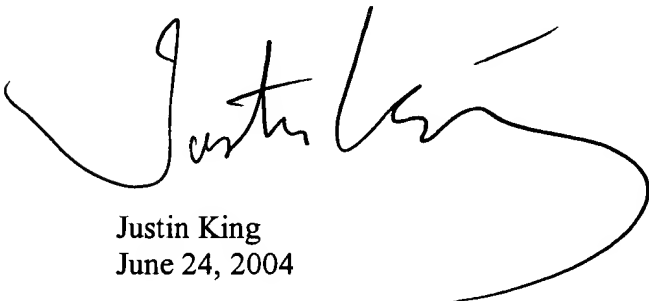
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Conclusion


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin I. King whose telephone number is 703-305-4571. The examiner can normally be reached on Monday through Friday, 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 703-308-3110. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Justin King
June 24, 2004



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